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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/025,535	12/26/2001	Koichi Sato	35.C16056	8293
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FITZPATRICK CELLA HARPER & SCINTO 30 ROCKEFELLER PLAZA NEW YORK, NY 10112				
			EXAMINER SADULA, JENNIFER R	
			ART UNIT	PAPER NUMBER
			1756	

DATE MAILED: 02/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/025,535

Applicant(s)

SATO ET AL.

Examiner

Jennifer R. Sadula

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12/26/01 and the filing of 4/9/2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) 7-9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 10-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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## DETAILED ACTION

### *Election/Restrictions*

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-6 and 10-15, drawn to a polymerizable compound, classified in class 560, subclass 1.
- II. Claims 7-8, drawn to a method of forming an image by using an image forming material, classified in class 427, subclass 457.
- III. Claim 9, drawn to an apparatus, classified in class 347, subclass 1.

The inventions are distinct, each from the other because of the following reasons:

Inventions II and III are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus claims are capable of being utilized for other method steps as the apparatus is merely capable of being used in the manner specified by Applicants' claim 7. Alternatively, the apparatus could eject an image forming material that does not comprise the compound of formula (1).

Inventions I and II are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case the compound need not be utilized as an image forming material or ink, but rather may also be merely a polymerizable liquid crystal such as for use in an LCD.

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Inventions I and III are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention III has separate utility such as an apparatus for forming an image via any composition other than that which is disclosed in invention I. See MPEP § 806.05(d).

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

During a telephone conversation with Jason M. Okun on 10 September 2003 a provisional election was made with traverse to prosecute the invention of I, claims 1-6 and 10-15. Affirmation of this election must be made by applicant in replying to this Office action. Claims 7-9 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

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### *Specification*

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

### *Claim Objections*

Claim 15 is objected to because of the following informalities: in line 2 of the claim, Applicants' state that "it scatters light". Although it appears as though Applicants' intend the pronoun to define the liquid crystal device, a modification wherein the pronoun is replaced with such terminology would create less ambiguity. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Verrall et al., UK Patent Application No. 2 330 360 ("Verrall").

Applicants claim in claim 1 a compound having a partial structure represented by formula (1): A-B-D-(E-G)<sub>e</sub>-(J)<sub>j</sub>-K-L wherein each of the substituents and units are as specified in claim

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1. Applicants further claim a polymeric compound having two or more monomer units represented by formula (2):  $A'-B-D-(E-G)_e-(J)_j-K-L$  wherein each of the substituents and units are as specified in claim 2. In both cases "e" and "j" are integers from 0 to 5 wherein  $e+j$  is not smaller than 2.

Verrall teaches a polymer film with a helically twisted molecular structure for use in decorative pigments, cosmetics, security applications or optical elements (abstract). The material comprises an achiral polymerizable mesogenic group selected from formula 1 wherein P is (among other variants) acrylic or methacrylic group A or A'; Sp-X equates to applicants B-D when  $n=1$ ; MG anticipates Applicants'  $-(E-G)_e-(J)_j-$  and R anticipates K-L. The mesogenic moiety MG of Verrall is selected from formula II wherein the aliphatic rings may be bound via a single bond, carboxyl group,  $C=C$  or  $C\equiv C$  grouping (see Verrall page 7). Verrall further teaches that m be either 1, 2, or 3. This teaching equates to when  $e+j$  is 2, 3, or 4 as each of the A units represent the rings of the mesogenic moiety. Verrall discloses that the compound may contain chiral components depending upon the intended use (pgs 8-9) and further discloses that the rings may be substituted or un-substituted.

As taught in the examples, the mixture or composition of Verrall may contain a number of polymerizable liquid crystalline materials. The material may further contain non-polymerizable mesogenic units that would thus satisfy the limitation of relatively low molecular weight liquid crystalline compounds (34:1-4). Such materials change orientational directions upon excitation.

With regard to Applicants' claims 3-4, Verrall teaches the materials to be thermochromic. A thermochromic material is one which is characterized by an ability to show a change of the

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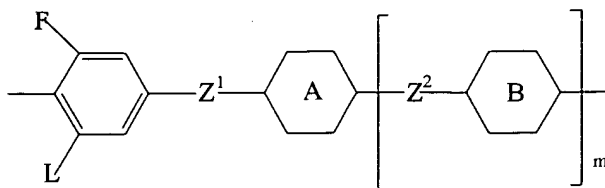
reflective wavelength upon temperature variation (Verrall, 2:11-22). Thus the compositional materials of Verrall are "image forming" dependent upon some form of excitation (thermal, electronic, etc). Examiner further notes, however, that this may not be the only interpretation of Applicants' phraseology of "image forming". As noted later in claim 7 it is noted that the phrase may be interpreted as an ink or printing material which will stain or dye a surface and thus produce an image. Verrall anticipates this interpretation of the claim language as well in that the materials are taught for use in decorative pigments, cosmetics, security applications or optical elements (abstract).

Verrall teaches in the abstract that, with regard to Applicants' claim 6, the material may further contain a dye component (otherwise known as a "pigment"). The dye component may be present from 0-20% by weight (30:14-36; 36:12) and consists or typically organic dyes (34:6-19).

Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Farrand et al., EP Patent Application No. 0 972 818 ("Farrand").

Farrand teaches polymerizable mesogenic fluorophenylenes for use in LCD's, polarizers, compensators, optical devices, pigments, diagnostics, cosmetics, and the like (abstract). With regard to a comparison between the materials of Farrand and Applicants' claimed component, Examiner notes the polymerizable mesogenic units of Farrand are selected from formula 1 (abstract; see also page 3) wherein P is (among other variants) acrylic or methacrylic group A or A'; Sp-X equates to applicants B-D when n=1; and R anticipates K-L. The mesogenic moiety is

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This mesogenic moiety of Farrand anticipates Applicants' mesogene wherein the ring structures are substituted with at least one fluorine (L may or may not be a fluorine); The Z units are each carboxyl, esters, ethyl, ether or a single bond. Since the "m" of Farrand is either 0, 1, or 2 this equates to when Applicants' e+j is 2, 3, or 4 as each of the units represent the rings of the mesogenic moiety. Specifically, with regard to Applicants' claim 2 Farrand teaches that it is particularly preferable to obtain a composition using one or more of the compounds of formula I (4:6-9). Furthermore, depending upon the intended use of the final composition, the R groups may be chiral or contain a chiral group (such as is the case when the material is utilized as a doping agent as specified in the abstract) (5:55-6:34).

With regard to Applicants' claims 3 and 4, Farrand teaches the compositions containing these mesogenic moieties are for use in pigments, diagnostics, cosmetics, decorative and security applications (abstract). The material comprises preferably at least two polymerizable compounds wherein at least one of the compounds is that of formula 1 (4:1-2). These materials may be utilized as thermochromic compositions which, as stated above, are considered "image forming" dependent upon some form of excitation (thermal, electronic, etc) (11:25-27).

With regard to Applicants' claim 5, Farrand teaches in the examples that the material is to be washed with water. Thus at one point in time the image forming material is contained within a aqueous solution of water.



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Lastly, as noted in Farrand's claim 10 these materials may be used in STN, TN, AMD-TN LCD's; guest-host, reflective, phase change or the like; nonlinear optics, optical information holographic and chiral dopants. The materials of Farrand are for coating upon a substrate and polymerizing or even aligning once attached to the substrate(s) (12:30-13:10). Particular attention is drawn toward the LCD's as these systems typically contain substrates comprising electrodes.

Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Parri et al., U.S. Patent No. 6,491,990 ("Parri").

Parri teaches monoreactive mesogenic compounds defined in formula 1 wherein (abstract; see also column 4) wherein P is (among other variants) acrylic or methacrylic group A or A'; Sp-X equates to applicants B-D when n=1; and Y<sup>1</sup> anticipates K-L as Y<sup>1</sup> may be an alkoxy group having 1-4 carbon atoms or may be COR<sup>1</sup> or COOR<sup>1</sup> wherein R is an alkyl group of C1-C3. The mesogenic moiety is Ph-Z<sup>1</sup>-Ph-Z<sup>2</sup>-Ph which may be optionally substituted with a single substituent (Y<sup>2</sup>) (examiner note: "Ph" is a short-hand abbreviation for a phenyl group). Since the compound of Parri contains three rings in the mesogenic structure, this equates to when Applicants' e+j is 3 as each of the units represent the rings of the mesogenic moiety. The "Z" units of the mesogene equate to G.

Specifically, with regard to Applicants' claim 2 Parri teaches that it is particularly preferable to obtain a composition using one or more of the compounds of formula I (4:26-30). These compounds are for use in optical elements (such as polarizers, alignment layers, retarders and compensators), in LCD's, polymer gels, adhesives, pigments, cosmetics decorative and security applications (4:35-45).

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***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10-15 are further rejected under 35 U.S.C. 103(a) as being unpatentable over either Verrall or Farrand as applied above, each alternatively in view of Iwamatsu et al., U.S. Patent No 6,565,932 ("Iwamatsu").

Farrand teaches the polymerizable mesogenic fluorophenylenes for use in LCD's, polarizers, compensators, optical devices, pigments, diagnostics, cosmetics, and the like which adhere to Applicants' formulas 1 and 2 as noted above. The material comprises preferably at least two polymerizable compounds wherein at least one of the compounds is that of formula 1 (4:1-2). These materials may be utilized as thermochromic compositions which again, as stated above, are considered "image forming" dependent upon some form of excitation (thermal, electronic, etc) (11:25-27).

The materials of Farrand may be used in STN, TN, AMD-TN LCD's; guest-host, reflective, phase change or the like; nonlinear optics, optical information holographic and chiral dopants. The materials of Farrand are for coating upon a substrate and polymerizing or even aligning once attached to the substrate(s) (12:30-13:10). Particular attention is drawn toward the LCD's as these systems typically contain substrates comprising electrodes, however no mention is made of the specific presence of electrodes.

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Alternatively, Verrall teaches a CLC polymer film with a helically twisted molecular structure for use in decorative pigments, cosmetics, security applications or optical elements (abstract) wherein the material comprises an achiral polymerizable mesogenic group selected from formula 1 which adheres to Applicants' formulas 1 and 2 as noted above. The mixture or composition of Verrall may contain a number of polymerizable liquid crystalline materials and may further contain non-polymerizable mesogenic units that would thus satisfy the limitation of relatively low molecular weight liquid crystalline compounds (34:1-4). Such materials change orientational directions upon excitation. Although Verrall teaches the materials for use in optical elements such as those containing the specific design of Applicants' claim 10, no mention is made of the specific presence of electrodes in Verrall's teaching.

Iwamatsu teaches a reflective type liquid crystal display having a nematic liquid crystal (NLC) composition disposed between a pair of transparent substrates maintaining electrodes thereon (abstract). The NLC material is a difluorostilbene compound and may comprise other liquid crystalline compounds (2:34-42). With regard to claims 12 and 13 the difluorostilbene component is relatively lower in molecular weight than the polymerizable LC materials of Farrand and Verrall and would scatter light when a voltage is not applied thereto. With regard to claim 14, this system is a two-frequency drive type liquid crystal.

It would have been obvious to one of ordinary skill in the art at the time of invention to produce the device of Iwamatsu utilizing a combination of liquid crystals including either those of Verrall or those of Farrand as both Verrall and Farrand teach the liquid crystalline materials to be capable of alignment of other liquid crystals or capable of self alignment depending upon the conditions. Furthermore, with regard to Applicants' claim 11 it is clear from the teaching of all

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three references that such a combination of liquid crystals would contain what is interpreted as a "low molecular weight liquid crystal compound" relative to their own respective weights.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Verrall et al., U.S. Patent No. 6,217,948 teaches the same compounds as noted above in Verrall's GB patent cited against the Applicants' under 35 USC 102(b).

Farrand, U.S. Patent No. 6,514,578 teaches polymerizable mesogenic tolanes of formula 1 which equate to Applicants' claimed composition. These compounds may be mono or bicrosslinkable depending upon if R is a polymerizable unit or not.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer R. Sadula whose telephone number is ~~703.305.4835~~ <sup>571-272-1391</sup>.

The examiner can normally be reached on Monday through Friday, 10am-6pm.

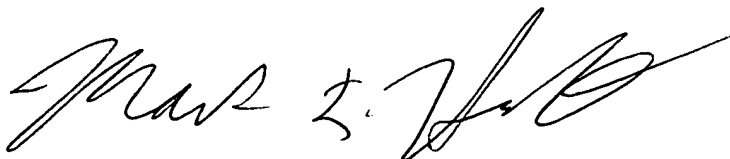
If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Mark F. Huff can be reached on ~~703.308.2464~~ <sup>571-272-1385</sup>. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308.0661.

JRS

10 September 2003

11264



MARK F. HUFF  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700